

(19)



European Patent Office
Office européen des brevets

(11) Publication number:

0 324 324
A1

(12)

EUROPEAN PATENT APPLICATION

(21) Application number: 88850408.1

(51) Int. Cl.4: **F16D 1/08** , **F16C 35/063** ,
F16C 35/073

(22) Date of filing: 05.12.88

(30) Priority: 11.01.88 SE 8800043

(43) Date of publication of application:
19.07.89 Bulletin 89/29

(84) Designated Contracting States:
DE FR GB IT

(71) Applicant: SKF Nova AB

S-415 50 Göteborg(SE)

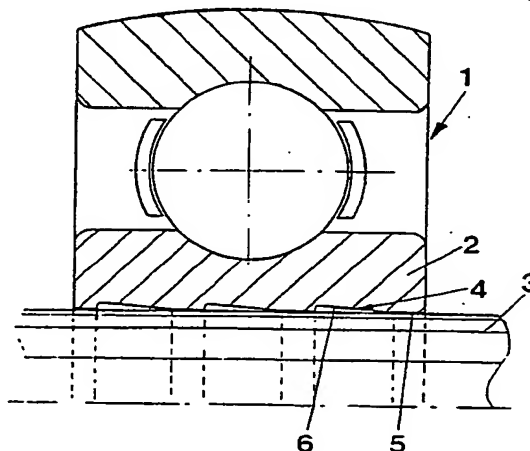
(72) Inventor: **Adolfsson, Rune**
Skyttegatan 4
S-502 43 Borås(SE)

(74) Representative: **Forsberg, Lars-Ake et al**
AB SKF Patent Department
S-415 50 Göteborg(SE)

(54) **A device for attachment of a machine member to a shaft.**

(57) A device for attachment of a machine member (2) to a shaft (3), whereby the machine member has an opening (4) for said shaft. The opening (4) has on one hand surface portions (5) of a shape corresponding to the shape of the shaft (3), cylindrical or tapering, and on the other hand surface portions (6) having a shape corresponding to the shape of the clamping surfaces of a clamping sleeve, for allowing optional attachment of the machine member (2) directly on the shaft (3) or by means of the clamping sleeve.

FIG 1



EP 0 324 324 A1

A DEVICE FOR ATTACHMENT OF A MACHINE MEMBER TO A SHAFT

Technical field

The present invention refers to a device for attachment of a machine member to a shaft, whereby the machine member has an opening for said shaft.

Description of the invention

When mounting a machine member, e.g. a bearing on a shaft, it is possible either to mount the machine member directly on the shaft by means of a press fit, a shrinkage fit or a glue joint or by means of a clamping sleeve having tapering grooves or threads, whereby the clamping force around the shaft is caused mainly by axial displacement of the machine member along the clamping sleeve.

Depending on which type of attachment is chosen, e.g. in connection with a ball bearing, different types of inner race rings must be available for the bearing. For mounting directly upon the shaft, which might be cylindrical or tapering, inner race rings having a cylindrical bore or a tapering bore resp. shall be used. At mounting with sleeve are used inner race rings having tapering portions corresponding to those of the clamping sleeve. Furthermore the bearing must be increased by one size. Manufacture and stock-keeping of several different standard types of the same element, i.e. in this case bearing inner race rings, of course implies a big cost.

Purpose and most essential features of the invention

The purpose of the present invention is to provide a more flexible system for mounting a machine member on a shaft, which substantially reduces the required number of standard types of the same element and therefore implies a cost-saving both regarding manufacture and stock-keeping. This has been solved in accordance with the invention therein that said opening firstly has surface portions of a shape corresponding to the shape of the shaft, cylindrical or tapering, and secondly has surface portions having a shape corresponding to the shape of the clamping surfaces of the clamping sleeve, for allowing optional attachment of the machine member directly on the shaft or by means of the clamping sleeve.

Description of the drawings

The invention hereinafter will be further described with reference to some embodiments shown in the accompanying drawings.

Figs. 1 - 3 are axial sections through different embodiments of the invention.

Description of embodiments

A machine member, here shown as an inner race ring 2 of a ball bearing 1, is attached to a shaft 3. The inner race ring 2 has a bore 4 provided firstly with cylindrical portions 5 and secondly with tapering portions 6. The bearing shown in Fig. 1 is attached directly upon the cylindrical shaft 3 by means of a shrinkage fit, a press fit or a glue joint, thus that the cylindrical portions 5 of the bore 4 cooperate with the shaft 3. For tapering shafts 3 the portions 5 of course shall have a taper corresponding to that of the shaft 3.

In the embodiment shown in Fig. 2 the inner race ring 2 of the bearing 1 is mounted on the shaft 3 via a clamping sleeve 7 having tapering grooves 8 and thread 9. The tapering grooves 8 cooperate with tapering portions 6 of the inner race ring 2, whereas a nut 10 is tightened around the threads 9 of the sleeve 7. The inner race ring 2 furthermore has cylindrical bore portions 5, which in this case however are inactive. Grooves 8 as well as threads 9 form a small angle to the axis of the sleeve, preferably a smaller angle than the friction angle in each contact, i.e. for an angle α shall $\tan \alpha < \mu$ where μ is the friction coefficient in each contact. The friction coefficient in a contact steel to steel is about 0.15, whereby the angles are preferably smaller than about 10° . The friction surfaces thereby are irreversible.

The inner race ring 2 shown in Fig. 3 has cylindrical portions 5 and tapering thread flanks 11 cooperating with corresponding thread flanks 12 in the clamping sleeve 7, which thread flanks form a small angle to the axis of the sleeve 7. The inner race ring 2 is provided with a key grip 16 and tightening of the joint is effected by the inner race ring being turned in relation to the sleeve 7. When turned, the two opposed tapering surfaces 13, 14 in the inner race ring 2 and in the sleeve 7 resp., press against each other, whereby a counterstay is established thus that the turning results in the thread flanks 11, 12 being pressed radially against each other and the sleeve 7 is deformed to seizing position around the shaft 3. The sleeve 7 is slotted

15 at the end situated in front of the key grip 16 in order to lock the inner race ring 2 against the sleeve 7 by turning, when so required.

The advantages gained by combining in one inner race ring a cylindric and tapering bore are, beside lower manufacturing and store-keeping costs, that it at shaft mounting, i.e. mounting directly upon the shaft, is possible to use a shaft of bigger diameter for the same bearing. The inner race ring furthermore will get a lower susceptibility to creeping, due to a higher concentration of the surface pressure in the pressing joint. At mounting with sleeve it is in a corresponding manner not necessary to increase the size of the bearing as compared to mounting directly on the shaft.

The size of the cylindrical surfaces 5 is adapted to appropriate surface pressures against the shaft 3 and which corresponds to the material in question, e.g. steel or plastic material. The positioning of the cylindrical or tapering surfaces 5 and 6 resp., can be adapted to the resultant load in the bearing type. Such a possible positioning is symmetrical to the radial centre line, see Fig. 1.

The invention is of course not limited to the embodiments shown but a plurality of modifications are possible within the scope of the accompanying claims.

Claims

1. A device for attachment of a machine member (2) to a shaft (3), whereby the machine member has an opening (4) for said shaft, characterized therein, that said opening (4) firstly has surface portions (5) of a shape corresponding to the shape of the shaft (3), cylindrical or tapering, and the secondly has surface portions (6, 11, 13) having a shape corresponding to the shape of the clamping surface (8, 12, 14) of a clamping sleeve (7), for allowing optional attachment of the machine member (2) directly on the shaft (3) or by means of the clamping sleeve (7).

2. A device as claimed in claim 1, characterized therein, that the surface portions corresponding to the clamping sleeve (7) are tapering portions (6, 13) and/or thread flanks (11), which form a small angle to the longitudinal direction of the clamping sleeve (7).

55

FIG 1

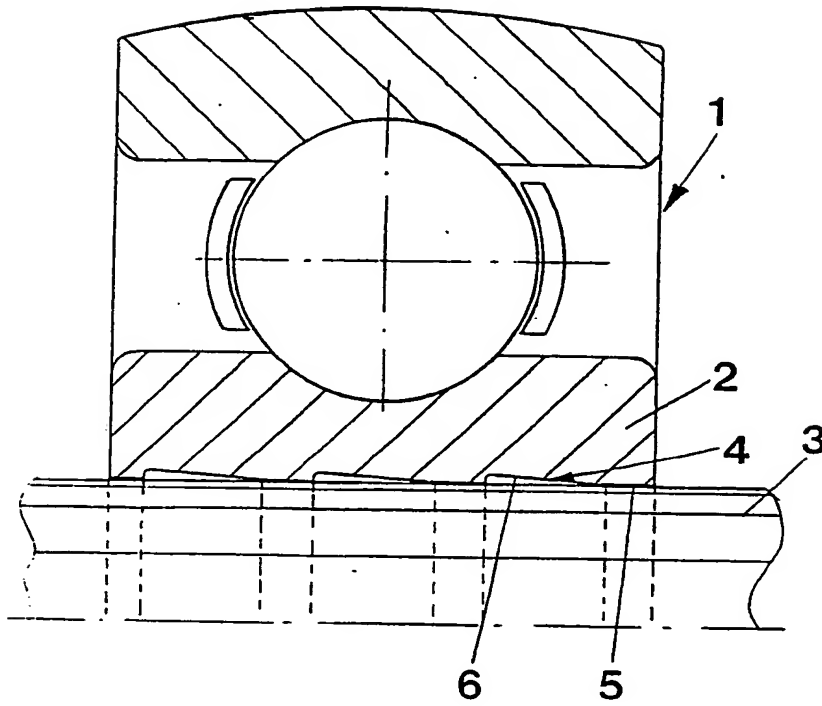


FIG 2

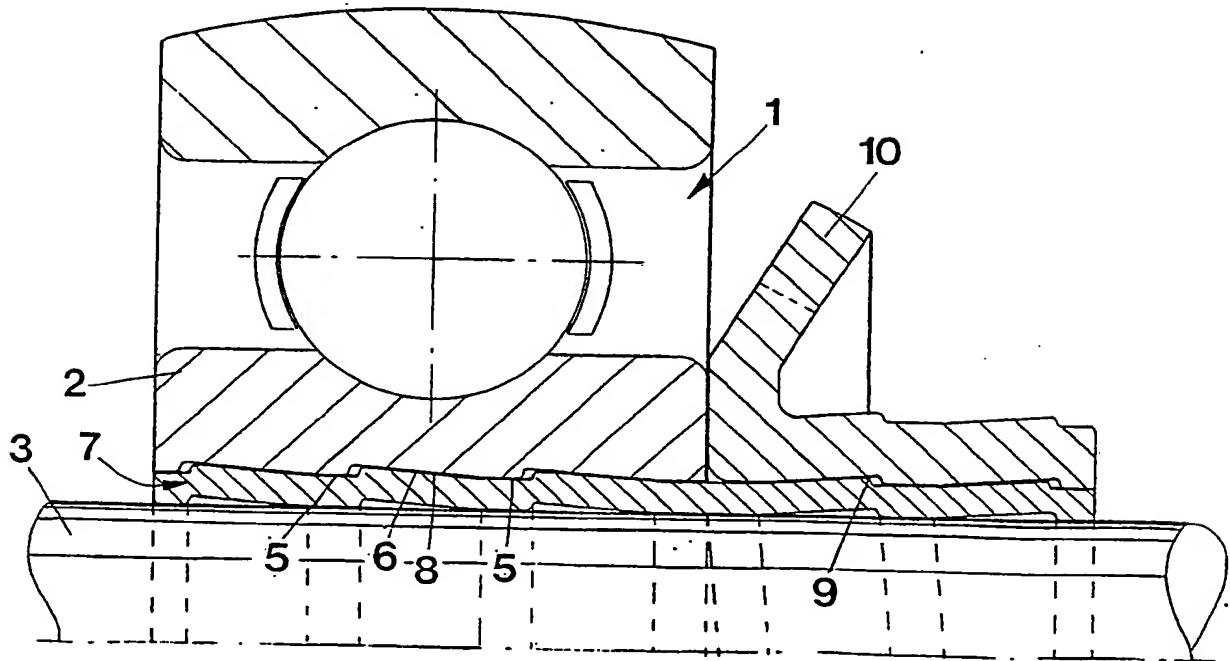
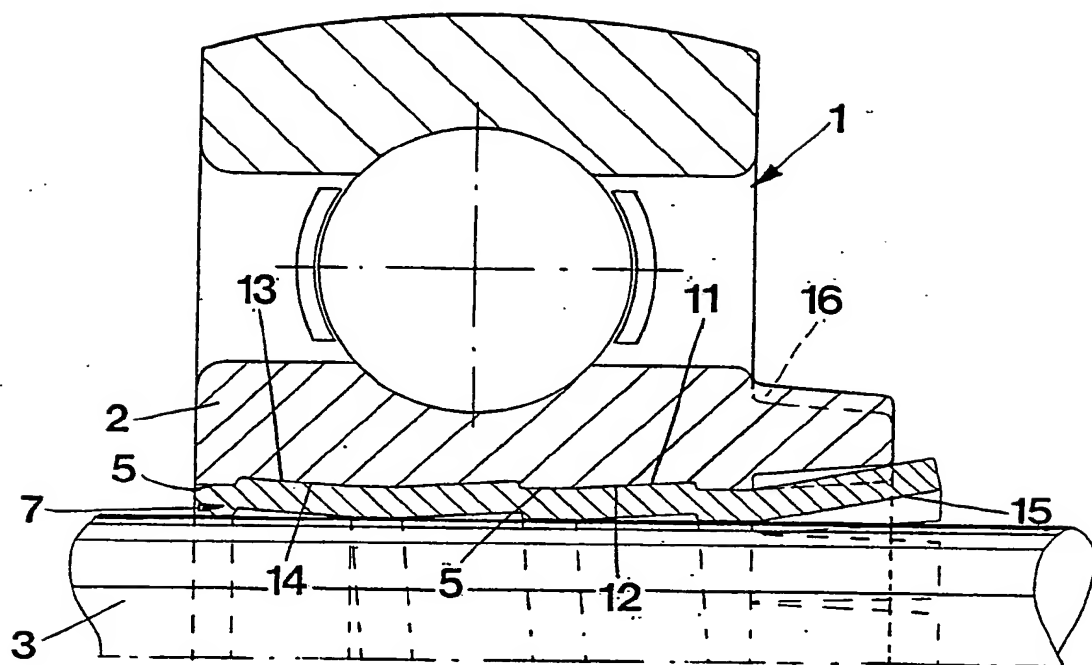


FIG 3





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

EP 88 85 0408

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 4)
X	US-A-2 397 703 (STALLMAN) * Pages 1,2; figures 1,2,8 * ---	1,2	F 16 D 1/08 F 16 C 35/063
X	DE-A-2 120 534 (ROSENTHAL) * Pages 4,5; figure 4 * -----	1,2	F 16 C 35/073
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			F 16 D 1/00
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 17-04-1989	Examiner BALDWIN D.R.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			